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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| EXAMINER |
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| ART UNIT | PAPER NUMBER |
|---|---|
| 2822 | |

DATE MAILED: 04/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/838,707 | PI ET AL. | |
| | Examiner | Art Unit | |
| | Kiesha L. Rose | 2822 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *12 February 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

## DETAILED ACTION

This Office Action is in response to the request for reconsideration filed 12 February 2003.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-6 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holland (U.S. Patent 6,259,085) in view of Kim (U.S. Patent 5,510,285).

Holland discloses a back illuminated charge coupled device (Fig. 2a) that contains a n-type silicon substrate (18) with a first and second surface opposing each other, a polycrystalline transparent conductive bias layer (12) formed over the back surface and in electrical contact and formed internal to the substrate (18) by doping the substrate (18), an antireflection layer (20) formed on the electrode layer (12) an array of doped p-type gate regions (27) formed on the second surface and a circuit layer (11) formed over the second surface to provide a gate contact to and a readout circuit for each doped region. Holland discloses all of the limitations except for a grid of conducting wires. Whereas Kim discloses an image sensor (Fig. 7f) that contains an electrode with an aluminum grid conducting wires (OSM2) formed over the electrodes to

form electrical connections to the electrodes and voltage source. Since Holland and Kim are both from the same field of endeavor, semiconductor devices, the purpose disclosed by Kim would have been recognized in the pertinent art of Holland. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the charge coupled device of Holland by incorporating conducting wires to form electrical connections to the electrodes as taught by Kim. In regards to a bias voltage applied to the substrate, it would have been obvious to one having ordinary skill in the art at the time the invention was made to bias a bias layer to provide an current to the substrate to the doped gate regions.

Claims 19 and 24-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holland (U.S. Patent 6,259,085) in view of Kim (U.S. Patent 5,510,285).

Holland discloses a back illuminated charge coupled device (Fig. 2a) that contains a n-type silicon substrate (18) with a first and second surface opposing each other, a polycrystalline transparent conductive bias electrode layer (12) formed over the back surface and in electrical contact and formed internal to the substrate (18) by doping the substrate (18), an antireflection layer (20) formed on electrode layer (12) an array of doped p-type gate regions (27) formed on the second surface and a circuit layer (11) formed over the second surface to provide a gate contact to and a readout circuit for each doped region. Holland discloses all of the limitations except for a grid of conducting wires. Whereas Kim discloses an image sensor (Fig. 7f) that contains an electrode with aluminum grid conducting wires (OSM2) formed over the electrodes to form electrical connections to the electrodes. Since Holland and Kim are both from the

same field of endeavor, semiconductor devices, the purpose disclosed by Kim would have been recognized in the pertinent art of Holland. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the charge coupled device of Holland by incorporating conducting wires to form electrical connections to the electrodes as taught by Kim. In regards to a bias voltage applied to the photodiodes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to bias a photodiodes to provide an electrical current through the device.

Claims 7-13 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holland and Kim as applied to claim 1 above, and further in view of Cox et al. (U.S. Patent 5,381,013).

Holland and Kim disclose all of the limitations except for the device comprising a scintillation. Whereas Cox discloses an imaging system (Fig. 7) that contains a scintillation (402) formed in a scintillation crystal connected to the imaging system. The scintillation is formed on the imaging system to convert incoming x-rays to visible light. (Column 1, lines 52-54) Since Holland, Kim and Cox are both from the same field of endeavor, semiconductor devices, the purpose disclosed by Cox would have been recognized in the pertinent art of Holland and Kim. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the devices of Holland and Kim by incorporating a scintillation to convert incoming x-rays to visible light as taught by Cox. In regards to an array of scintillation, Cox discloses the claimed invention except for and array of scintillation. It would have been

obvious to one having ordinary skill in the art at the time the invention was made to have an array of scintillation, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. St. Regis Paper Co. v. Bemis Co., 193 USPQ 8 (1977).

Claims 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holland and Kim as applied to claim 19 above, and further in view of Cox et al. (U.S. Patent 5,381,013).

Holland and Kim disclose all of the limitations except for the device comprising a scintillation. Whereas Cox discloses an imaging system (Fig. 7) that contains a scintillation (402) formed in a scintillation crystal connected to the imaging system. The scintillation is formed on the imaging system to convert incoming x-rays to visible light. (Column 1, lines 52-54) Since Holland, Kim and Cox are both from the same field of endeavor, semiconductor devices, the purpose disclosed by Cox would have been recognized in the pertinent art of Holland and Kim. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the devices of Holland and Kim by incorporating a scintillation to convert incoming x-rays to visible light as taught by Cox. In regards to an array of scintillation, Cox discloses the claimed invention except for and array of scintillation. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have an array of scintillation, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. St. Regis Paper Co. v. Bemis Co., 193 USPQ 8 (1977).

Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holland, and Kim as applied to claim 1 above, and further in view of Kasai et al. (U.S. Patent 5,262,633).

Holland and Kim disclose all of the limitations except for the antireflection layer to include a dielectric layer. Whereas Kasai discloses a wideband antireflection coating (Fig. 1) that contains a multilayer antireflection layer (30) comprised of dielectric layers (30a) having a specific refractive index. The antireflection layer comprises dielectric layers to enable detection of light at visible as well as infrared wavelengths. (Column 1, lines 11-13) Since Holland, Kim and Kasai are both from the same field of endeavor, semiconductor device, the purpose disclosed by Kasai would have been recognized in the pertinent art of Holland and Kim. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the devices of Holland and Kim by incorporating an antireflection layer comprising a dielectric layer to enable detection of light at visible and infrared wavelengths as taught by Kasai.

Claims 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holland, Kim and Cox as applied to claim 19 above, and further in view of Kasai et al. (U.S. Patent 5,262,633).

Holland, Kim and Cox disclose all of the limitations except for the antireflection layer to include a dielectric layer. Whereas Kasai discloses a wideband antireflection coating (Fig. 1) that contains a multilayer antireflection layer (30) comprised of dielectric layers (30a) having a specific refractive index. The antireflection layer comprises dielectric layers to enable detection of light at visible as well as infrared wavelengths.

(Column 1, lines 11-13) Since Holland, Kim, Cox and Kasai are both from the same field of endeavor, semiconductor device, the purpose disclosed by Kasai would have been recognized in the pertinent art of Holland, Kim and Cox. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the devices of Holland, Kim and Cox by incorporating an antireflection layer comprising a dielectric layer to enable detection of light at visible and infrared wavelengths as taught by Kasai.

### *Response to Arguments*

Applicant's arguments filed 12 February 2003 have been fully considered but they are not persuasive. In regards to the applicant's argument about the Kim reference not discloses a grid of conducting wires. The Kim reference discloses conducting wires OSM2 that are connected together and show other wires crossing the conducting wires which put them in electrical connection therefore they are a grid of wires and they are connected to the bias layer. (Fig. 5, lines 5-7) In regards to the scintillation, the Cox reference discloses one scintillation and if one is already formed it would be mere duplication to have more than one scintillation as claimed. Therefore the rejection stands.

### *Conclusion*

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kiesha L. Rose whose telephone number is 703-605-4212. The examiner can normally be reached on M-F 8:30-6:00 off 1st Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 703-308-4905. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

KLR
April 4, 2003

AMIR ZARABIAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800